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DERWENT-ACC-NO: 1986-311847
DERWENT-WEEK: 198648

TITLE: Frozen meat particles - obtd. by extruding ground meat as strip and freezing then comminuting

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PATENT-ASSIGNEE:

ASSIGNEE	CODE
STANDARD MEAT CO	STMEN

PRIORITY-DATA: 1983US-0512415 (July 8, 1983)

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ABSTRACTED-PUB-NO: CA 1213170A
BASIC-ABSTRACT:

Meat prod. is produced by grinding raw meat and extruding it as a homogeneous strip. This is frozen and comminuted to form frozen particles. Typically, the meat is initially ground into particles of size 0.125 inch and is finally comminuted into particles of size 0.125-0.750 inch.

Ground meat contg. 70-90% lean meat is extruded and frozen at 0 to -40 deg.F for 20 mins. The resultant strip is cut into 3 inch sections and then diced to produce the final frozen particles.

Pref. the particles are poured into containers for supply to the consumer. Any fluid sepd. from the ground meat before extrusion is comingled with the meat to be reabsorbed during extrusion.

USE/ADVANTAGE - The frozen particles remain separate and portions

of the reqd. wt. can be taken from a bag of frozen particles. Fluid loss from the meat prod. is minimised during the formation of the frozen particles. The particles may be thawed rapidly when needed.

CHOSEN-DRAWING: Dwg.0/1

TITLE-TERMS: FREEZE MEAT PARTICLE OBTAIN EXTRUDE GROUND MEAT STRIP FREEZE COMMINUTE

DERWENT-CLASS: D12

CPI-CODES: D02-A03B; D03-H02A;

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(19) (CA) **CANADIAN PATENT** (12)

(54) Meat Product and Manufacturing Process

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MEAT PRODUCT AND MANUFACTURING PROCESS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention pertains to a comminuted ground beef or hamburger type meat product in frozen particle or pellet form made by a process which produces a flowable product having relatively little fluid loss and which may be subdivided into portions of any preselected size without thawing the entire original quantity from which the portions are obtained.

Background

So-called ground or finely chopped beef and other edible meats are widely used in a great variety of food products for human consumption. Ground beef has become a staple food item found in virtually every domestic refrigerator and foodstore, and is included in a wide variety of dishes served in restaurants and institutional food servicing systems. The conventional method of producing ground beef comprises primarily the operation of grinding raw meat, which may be fresh or previously frozen, followed by packaging the ground meat as a somewhat cohesive mass in various size loaves or blocks which are then frozen for preservation purposes until required for use in cooking one of the myriad of dishes using such meat products.

There are several longstanding problems in connection with the use of conventional frozen ground beef meat products. Most grocery stores supply refrigerated or frozen ground beef in a homogeneous mass of various sizes, such as in one, two or five pound packages. If the mass is frozen by the store or by the consumer it must be thawed at least partially or completely by the user even when

preparing dishes that do not require the entire contents of the package. Similarly, restaurants and institutional food preparers use larger frozen blocks of ground beef which require partial or complete thawing of large cohesive masses or quantities of beef in order to separate a lesser portion required for the preparation of a selected dish. After the required portion of thawed meat is separated from the original loaf or block of meat the portion not used for cooking is normally refrozen to preserve it for future use.

One of the problems with using conventional frozen ground beef in the manner described above is the unnecessary spoilage which often occurs during thawing. The partial or complete thawing of a cohesive mass of ten, five or even one pound weight requires considerable time in order to obtain the portion of meat to be used in the preparation of a particular food item. It is difficult, if not impossible, to control the thawing process to prevent unwanted thawing of the portion of the mass which will not be used, and the unused thawed portion must then be refrozen until needed. Since thawing time is difficult to control and is increased with the size of the loaf or block of meat, the meat may stand too long at ambient temperature thereby increasing spoilage of the portion to be used as well as the portion to be refrozen for future use.

Another problem occurs because conventional slow freezing or refreezing of thawed meat by the consumer causes the meat cells to rupture, resulting in substantial fluid loss upon thawing. This is particularly true when the freezing time exceeds approximately two hours. Since conventional home, institutional and restaurant freezers are not adapted for quick freezing of foodstuffs, the normal time required for freezing or refreezing relatively large quantities of ground

beef is so long that the meat is substantially damaged, thus reducing the quality of the product when it is finally cooked. The meat is damaged because the slow freezing process causes the formation of relatively jagged and irregular shaped ice crystals as water and other liquids freeze within the cells. These sharp crystals rupture the meat tissue cells, resulting in substantial loss of fluids from the product when it is thawed prior to cooking. This loss of fluid degrades the quality of the meat in regard to its taste, texture and nutritional value. This fluid loss also reduces the weight of the precooked as well as the cooked product, which can be particularly important in commercial meat preparation operations. Moreover, the slow freezing meat is exposed much longer to ambient atmospheric conditions promoting bacteria growth, which can also damage the meat before it is completely refrozen.

Accordingly, the slow thaw time, the slow freezing and refreezing times, and the other inconveniences associated with providing packaged ground beef in relatively large cohesive masses have been detrimental to the popularity, nutritional value, and safety of this widely used meat product.

Apart from the process for preparing ground beef as described above, several processes or methods are known for the production of comminuted beef and other types of meat products. Grinding or other comminuting operations are performed on relatively large pieces of meat after removal from the animal carcass, followed by various freezing operations to provide a comminuted end product. For example, U.S. Patent 3,047,398 to D. B. Watt teaches one known type of meat preparation process in which the meat is comminuted into relatively small particles prior to quick freezing the particles for

storage. This process is unattractive for several reasons. First, comminution to produce relatively small uncooked and unfrozen particles results in substantial fluid loss prior to freezing. Moreover, by forming small particles prior to hard freezing a substantial surface area of the meat is exposed to temperatures at or above the freezing temperature, resulting in extensive taste and texture degradation. It is also very difficult to maintain the particles separated from each other prior to hard freezing so that large clumps are not formed during the freezing process. These problems severely limit production rates and reduce the commercial viability of the process.

Thus, prior to the present invention, it was widely believed in the meat processing industry that the loss of fluids and the attendant degradation of meat quality from ground or otherwise comminuted meat, primarily beef products, could not be avoided. As described above, this degradation is especially pronounced for processes involving comminution and then freezing the comminuted product, regardless of freezing time.

One way to reduce this degradation is by cooking the meat product prior to freezing and storage, such as in the preparation of pizza toppings. Typically, the ground meat is extruded into relatively thin elongated strands which are cooked, then frozen and comminuted for use as pizza toppings. Of course cooking cannot be used in the preparation of raw meat products. In fact, many of the factors which are important in the preparation of cooked ground meat products are not of great consideration in the preparation of raw ground meat products. For example, precooked and frozen pizza-type meat toppings have been developed primarily to minimize preparation time of the end product. That factor is not usually as important to the purchaser of a

raw ground beef product as the factors of palatability and nutrition. Moreover, precooked meat may not be readily shaped into patties or other forms and is, therefore, not usable in the preparation of many meat dishes.

In summary, because of various problems in conventional methods of producing, packaging and using ground beef, meat processors have not been able to produce an uncooked, frozen ground beef product capable of maintaining essentially all of its moisture and texture, having a very low thaw time, and being easily subdivided into small portions for cooking. The present invention overcomes substantially all of these prior disadvantages. The present invention yields a unique, superior product made by a process which is relatively inexpensive, utilizes primarily conventional meat processing equipment, and provides several advantages to the user.

SUMMARY OF THE INVENTION

The present invention provides an improved meat product produced from raw meat cuts which are ground or otherwise comminuted, extruded into elongated homogeneous strands which are quick frozen and then broken or cut into small particles or pellets to form freely flowable or pourable portions which, upon being thawed, do not exhibit significant loss of fluids and maintain a high quality of taste and texture. As used herein, the terms "flowable or "pourable" refer to a characteristic of small discrete particles which may be handled by pouring or being made to flow from one container to another.

In accordance with one aspect of the present invention there is provided a ground beef type meat product which is substantially flowable or pourable and comprises a pelletized or comminuted mass which may be conveniently subdivided into portions of selected size

while in the frozen or unfrozen state. In this way only the portion of meat to be actually cooked or otherwise used in the preparation of a food item is subject to the thawing process and the remainder of the packaged quantity of meat may be immediately replaced in frozen storage to prevent unwanted thawing.

In accordance with another aspect of the present invention there is provided an improved meat product wherein uncooked beef or other edible animal flesh is taken from a hot deboning operation upon slaughtering of the animal or taken from previously slaughtered and preserved cuts of meat and processed into a frozen particle having a maximum linear dimension of approximately .750 to 1.0 inches and a minimum linear dimension of approximately .125 to .375 inches. Pellets or particles at the lower end of this size range, in particular, have been found to be storable without a substantial increase in the amount of space occupied for a given weight quantity of meat, wherein the freezing and thawing times required to completely freeze the particles, and to completely thaw the particles is substantially reduced, and where the meat product is flowable to facilitate the subdividing of selected portions of the product without requiring the thawing of a large cohesive mass. The formation of relatively small particles or pellets from frozen extruded strands wherein the cross-sectional area of the strands is small enough such that the freezing time of the strands is less than two hours, and preferably on the order of twenty minutes or less, substantially reduces the damage to the cellular structure of the meat resulting in minimal loss of fluids from the quantity of meat upon thawing for use. The cross-sectional area of the strands is also, however, maintained large enough to prevent loss of fluids from the meat during the extrusion process.

In accordance with still another aspect of the present invention there is provided a beef or similar edible meat product which is prepared by cutting elongated frozen strands of ground and extruded meat into particles or pellets having a somewhat irregular and easily distortable shape so that, upon thawing a preselected portion or quantity of meat, the thawed portion may be shaped into virtually any desired configuration.

In accordance with still a further aspect of the present invention there is provided an improved process for manufacturing a meat product, wherein said product comprises a quantity of flowable or pourable discrete particles and which quantity may be subdivided into selected portions prior to cooking. The process of the present invention preferably comprises the steps of providing selected size cuts of raw meat from a hot deboning operation or from a stored quantity of meat, comminuting the meat by a cutting or coarse grinding operation followed by a further grinding operation, if needed, to reduce the meat to a particle size which may be extrudable, maintaining substantially all of any fluids separated from meat tissue during unfrozen comminution in contact with the meat being processed, extruding the ground meat into elongated strands, quick freezing the strands and breaking or cutting the strands into particles of frozen meat which are flowable and whereby preselected portions of meat may be easily subdivided from an aggregate amount of the particles while the particles are frozen.

In accordance with a further aspect of the process of the present invention it has been discovered that the cutting and grinding operations may be conducted in such a way that the cellular structure of the meat is left relatively undamaged and any fluids released from the meat tissue during the cutting and grinding operations is retained

and substantially reabsorbed by the comminuted meat as it processed to the formation of frozen particles thereby resulting in a negligible loss of fluid from the mass of meat before formation of the final size particles and upon thawing of the particles.

In accordance with yet another aspect of the process of the present invention extruded strands or "ropes" of uncooked meat are frozen rapidly in at least less than two hours time and preferably less than twenty minutes elapsed time from commencement of the freezing process to thorough freezing of the strands, said strands then being comminuted to form frozen meat particles which exhibit negligible fluid loss when thawed.

The process of the present invention also provides for the formation of frozen particles of previously comminuted, extruded and frozen meat strands, which particles are somewhat irregularly shaped and are easily distorted upon being thawed to facilitate the formation of cohesive shaped meat products such as patties and other compacted or shaped articles which remain intact during and following a cooking process.

The process and product of the present invention provides several advantages in the art of meat processing and production. A surprising result and advantage derived from the present invention is the provision of a ground beef or similar edible animal meat product having a negligible loss of natural fluids and weight prior to cooking.

Since the meat product is comminuted, then extruded, and is furnished in a final form as a comminuted flowable and separable bulk material, the final end product may be custom blended or mixed with any proportion of lean/fat meat in accordance with the customer's or user's specifications.

Flowability and ease of separating portions of the meat product from a larger stored quantity reduces the need to thaw large quantities of material which must then be refrozen or otherwise disposed of. This feature is particularly advantageous for restaurant and institutional food preparers whereby adjustments in the quantity of thawed meat and prepared meat can be made in accordance with demand without refreezing or otherwise disposing of unused meat portions. The flowability of the meat product is also advantageous for use in conjunction with dishes such as casseroles, soups, pizzas and other dishes requiring a ground or granular meat product.

The minimal thaw time and the minimal freezing time required for the product also is particularly advantageous in regard to extension of product shelf life reducing the time from withdrawal of the product from storage to finish cooking, and in regard to minimizing product taste and texture degradation.

The reduced or essentially negligible loss of fluids and cell rupture of the meat improves the cooking yields of the meat product and substantially improves the taste and texture of the cooked product as compared with conventional ground meat products. Moreover, the unused portions of the product do not require removal from the storage container or package and thereby have considerably less exposure to ambient temperatures.

The abovenoted advantages and salient features of the present invention as well as additional superior aspects thereof will be further appreciated by those skilled in the art by reading the detailed description which follows.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1 is a schematic diagram of a system for preparing the meat product of the present invention in accordance with the process of the present invention; and

Figure 2 is a perspective view showing a quantity of the meat product in a storage container and a separated portion of the meat product.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is directed to the provision of an improved meat product characterized generally as ground beef or hamburger. Although a typical product in accordance with the present invention and derived from the process of the present invention utilizes a raw material comprising raw beef cuttings having a lean meat content in the range of 70% to 90% of the total weight of the product, with the balance of the weight being in the form of beef fat, those skilled in the art will appreciate that the product and process of the present invention may utilize lean and fat meat of different proportions, blends of beef and other animal flesh, or meats comprising all meat of another particular type, such as pork or poultry. The product and process described herein, however, relates primarily to a ground beef product commonly referred to as hamburger having a lean meat content of 70% to 90% by weight and a fat content of 30% to 10%, respectively. The raw material provided for the process of the present invention typically may comprise previously cut and frozen pieces of beef carcass which have been substantially deboned. The product and process of the present invention also contemplates the use of a raw or input material comprising meat from a so called hot deboning process wherein the animal carcass is processed to strip the meat from the bone virtually

immediately after slaughtering the animal and the meat is then introduced directly to the process of the present invention.

The process for obtaining a preferred product in accordance with the present invention will now be described in conjunction with Figure 1 of the drawing. The process contemplates the use of known pieces of equipment which will be described in general terms herein. It will be understood that the equipment used in the process may, except as noted herein, be obtained from commercial sources or by other means known to those skilled in the art.

Referring to Figure 1, there is illustrated in schematic form a system for producing the meat product of the present invention, which system is generally designated by the numeral 10. Certain portions of the processing system 10 may take various forms but typically the system comprises an input conveyor mechanism 12 which is adapted to receive quantities of meat cuttings from suitable storage containers, not shown. The conveyor 12 may be one of various types but is preferably a single screw or auger type conveyor. The conveyor 12 is adapted to convey relatively large cuttings of raw beef either from a hot deboning process or from bulk quantities which have been previously stored at refrigeration temperatures typical for relatively short term preservation of raw meat. The conveyor 12 is arranged to discharge meat to a powered cutting apparatus 16 of the rotating cylindrical bowl type having a powered multi bladed rotary cutting knife 18 and a movable discharge dam 19. The cutting apparatus 16 may be of a type manufactured by Kraemer-Grebe of Wallau, West Germany, as their model SM500. The cutting apparatus 16 receives raw meat cuttings in a rotating bowl 17 which passes the meat through the cutting knifes 18 as a result of one or more revolutions of the bowl wherein the meat is

thoroughly cut or chopped into particle sizes typically in the range of .750 inch maximum linear dimension. The cutting operation provided by the apparatus 16 may also be accomplished by a so called coarse grinding step wherein the relatively large chunks or cuts of meat may be reduced to a particle size which will permit the performance of a further grinding operation on the meat. The temperature of the meat at the point of cutting by the cutting apparatus 16 is typically in the range of 34°F to 40°F.

Meat particles cut by the cutting apparatus 16 are discharged from such apparatus by moving the dam 19 into the path of the meat cuttings in the bowl 17 whereby the cuttings are forced into a discharge chute 15 for delivery to suitable conveying means 20 for transport to a second cutting or grinding operation carried out by a grinder apparatus 22. The grinder apparatus 22 is of a conventional type such as an apparatus made under the trademark BUTCHER BOY (model AU 56) by Lasar Manufacturing Company of Los Angeles, California. The grinding apparatus 22 is preferably provided with an auger type conveyor which forces the comminuted meat through an orifice plate upstream of which a plurality of rotating knives are provided for cutting the meat into smaller particles as it is forced through the orifices in the aforementioned plate. The fine grinding or comminuting operation performed by the grinder apparatus 22 preferably utilizes an orifice plate having .125 inch diameter orifices so that particles approximately .125 inches in diameter are discharged from the apparatus 22.

The meat product expelled from the grinder apparatus 22 is conveyed by suitable conveyor means or discharged directly to a receiving hopper 26 for a pump 28. The pump 28 may be one of

several types of pumps which are adapted to force finely ground meat substantially continuously through a discharge line 30 and through an extrusion head or horn 32. The pump 28 may be a model 629 manufactured by Marlen Research Company, Overland Park, Kansas. The extrusion head comprises a generally nozzle shaped or flared housing 34 which is adapted to support an orifice plate 36 having a plurality of spaced apart orifices through which the ground meat may be extruded at a pressure provided by the pump in a range sufficient to provide substantially continuous strands 37 of meat as the extrudate discharged from the head 32. In a preferred arrangement in accordance with the present invention the extrusion head 32 is provided with an extrusion plate 36 having a plurality of spaced apart orifices of approximately .375 inches diameter. The orifices are arranged in five generally horizontal rows and spaced on 1.50 inch centers and are preferably circular in shape.

Although the extrusion orifices specified above are preferred for a product comprising primarily a hamburger type product of the lean and fat proportions specified herein, it is contemplated in accordance with the present invention that the extrudate emanating from the orifice head 32 may have a cross-sectional diameter in the range of from .125 to .750 inches. Certain limiting factors in regard to the overall cross-sectional area of the extrudate or strands 37 which preferably limits the dimension to approximately .50 inches maximum pertain to reduction in the freezing time for the strands, and in the strength of the downstream cutting or frozen particle breaking equipment. It is also indicated that in processing raw beef an orifice size of about .375 inches diameter is an optimal minimum size which will not result in clogging of the orifices due to connected tissue in the

meat particles and which also prevents loss of fluids from the cell structure of the meat.

The extrudate from the head 32, comprising the elongated strands 37, is deposited on a conveyor system 42 which extends to a freezing apparatus, generally designated by the numeral 44. The freezing apparatus may take several forms and is preferably a space saving spiral ascension type freezer utilizing refrigerated air as the heat transfer medium for extracting heat from the strands deposited on the conveyor 44. The conveyor 44 is preferably a continuous flexible belt or chain link type conveyor and may be provided in the form of two separate conveyor elements 45 and 46 operating at different relative surface speeds so that material discharged from the conveyor 45 onto the conveyor 46 will be spread out somewhat to reduce the density of material sufficient to assure that prompt freezing occurs and to prevent the formation of a coagulated mass which may interfere with conveyor operation.

With the discharge of .375 inch diameter rope or strand onto the conveyor 46, it has been determined that a freezing time in the range of 5 minutes to 20 minutes may be accomplished utilizing airblast or forced air circulation over the conveyor at a temperature of the forced air heat exchange medium in the range of 0°F to -40°F. The temperature of the strands 37 emanating from the extruder head 32 is typically in the range of 40°F to 50°F and the strands are thereby easily formed. Those skilled in the art will appreciate that the type of freezing apparatus described may be replaced by other freezing equipment such as liquid nitrogen immersion freezing apparatus, liquid carbon dioxide spray type apparatus or other apparatus capable of a heat exchange rate which will provide for complete freezing of the

stranded meat in a period of time less than two hours and preferably in the range of 20 minutes or less.

The schematic diagram of Figure 1 also illustrates the conveyor section 46 emerging from the freezing apparatus 44 and arranged to discharge frozen, contiguous and side-by-side strands of meat product into a hopper 50 of a delumping or comminuting apparatus 52. The comminuting apparatus 52 is preferably of a type not unlike a hammermill having a plurality of radially extending rotating fingers or hammers 53 mounted on a driven shaft 57 and spaced between respective sets of stationary fingers or hammers 55. The spacing of the hammers 53 and 55 is such that, in passing the frozen strands 37 through the apparatus 52, the strands will be broken or comminuted into particle sizes in the range of about 3 inches maximum length. As shown in Figure 1, a second stage of comminution or particlization of the meat product of the present invention is provided by an apparatus 54 comprising a dicing machine of a type commercially available such as one made by Urschel Laboratories of Valparaiso, Indiana as their model J-A. The particlizing or comminuting apparatus 54 is preferably set to provide a major portion of particles having a maximum linear dimension in the range of approximately .375 inches to 1.0 inches. Although particle sizes smaller than .375 inches may be obtained, the flowability of smaller particles is not particularly enhanced, and the amount of damage to the cell structure of the meat is increased with the smaller the particle formed. On the other hand, the larger size particles reduce the pourability or flowability of the material and consequently its handling characteristics. The larger size particles are also less attractive for use in providing shaped products such as hamburger

patties and when used in certain types of dishes such as casseroles and as pizza toppings, for example.

The comminution of the frozen strands by a two stage or two step process as described also provides particles which are somewhat irregular in shape and seem to adhere to each other particularly well in forming shaped meat products from thawed particles.

After discharge from the dicing apparatus 54 the meat product in its frozen state may be packaged in suitable containers such as clear plastic bags 56 shown in Figures 1 and 2 wherein a quantity of the meat product of the present invention is contained and is generally designated by the numeral 58. Figure 2 also illustrates a small subdivided portion 60 of the meat product 58, the size of which may be preselected to be of virtually any size down to the selection of a single particle.

As the meat product 58 is packaged, it may be immediately stored at a temperature of less than 32°F and preferably in the range of 0°F, indefinitely, and may be easily taken from storage or, while in storage, subdivided into portions which may be thawed at ambient temperatures in a relatively short period of time. In fact, in spreading of a single layer of particles of the meat product 58 onto a tray or plate at a normal ambient temperature in the range of 72°F to 80°F will result in complete thawing of the product particles in less than approximately 10 to 15 minutes. This thawing time is, of course, attractive to enable the formation of various meat products such as hamburgers, meatloaves, and other shaped products preparatory to cooking. The subdivided portions of meat may also be cooked without a full thawing process since exposure to cooking temperature will result

in a very rapid thaw and then the physical and chemical changes associated with exposure to cooking temperatures.

The meat product 58 prepared in accordance with the aforedescribed process has provided some surprising and unexpected results. The pourability or flowability of the product at temperatures below 32°F is excellent and is not unlike that of a purely granular solid material. Even in the range of temperatures up to normal ambient or room temperature the product 58 is highly flowable to facilitate subdividing or handling of selected size portions of the product. A more remarkable or surprising result is the negligible loss of fluid from the product in the manufacturing process and as a result of thawing the particles of the finished product 58. Such fluids, sometimes referred to as blood, actually includes some blood and a larger portion of a watery serumlike liquid which is present as part of the meat composition prior to processing.

The virtually total retention of fluids in the meat is believed to result not only from the rapid freezing time but the particular sequence and the parameters of the process steps wherein any fluid released from the cell structure of the meat as it is being processed is maintained in contact with the mass of meat being processed up to and including the extrusion step. The fluids separated from the comminuted particles prior to extrusion are reabsorbed by the meat tissue during extrusion. The rapid freezing process that occurs immediately after the extrusion step also reduces the tendency for the separation of any fluids and the reduced meat cell structural damage also aids in retention of fluids and without altering the meat texture. Moreover, the two stage comminution of the frozen strands is also believed to cause less cell structural damage than prior art processes. This fluid retention is

particularly important in regard to the retention of nutritional substances such as liquid proteinaceous materials and other substances and in regard to improved taste, texture, weight control and cooking characteristics of the meat.

Although an improved process of providing the unique meat product of the present invention has been been described herein in conjunction with the description of the resulting product itself, those skilled in the art will recognize that certain steps in the overall process may be modified. For example, the steps associated with providing material sufficiently comminuted to permit extrusion through the extrusion head 32 may involve more than a cutting and grinding step such as, for example, coarse and fine grinding steps in succession. Other types of comminuting apparatus may also be used to reduce the particle size of the meat introduced to the pump 28. It is indicated that the minimum particle size suitable for avoiding loss of fluid and yet providing a flowable and palatable end product without extensive connective tissue is in the range of .375 inches linear dimension, although a minimum particle size of approximately .125 inches linear dimension may be acceptable.

Although preferred embodiments of a process and a product in accordance with the present invention have been described in detail herein those skilled in the art will recognize that various substitutions and modifications may be made in the process and the meat product without departing from the scope and spirit of the invention as recited in the appended claims.

What we claim is:

1. A meat product produced from raw meat cuts which are ground, extruded into elongated homogeneous strands, said strands being frozen and comminuted to form particles, said particles comprising the smallest discrete particle size of said meat product formed subsequent to grinding said meat cuts whereby fluid loss from said meat product is minimized during the formation of said particles.

2. The meat product set forth in Claim 1 wherein:

said particles have a maximum linear dimension in the range of approximately .125 to .750 inches.

3. A meat product comprising a quantity of frozen particles of ground beef and the like, said particles being formed by comminuting elongated frozen strands of said ground beef wherein a majority of said particles in a given quantity of said meat product have approximate maximum linear dimensions of .750 inches and minimum linear dimensions of .125 inches.

4. An uncooked meat product comprising discrete frozen particles formed from ground and extruded meat having a negligible loss of natural fluids subsequent to grinding said meat and upon thawing said particles.

5. The meat product set forth in Claim 4 wherein:

extrudate formed by extrusion of said meat is of sufficiently large cross-sectional area to result in negligible loss of fluids as a result of extrusion.

6. The meat product set forth in Claim 4 wherein:

extrudate formed by extrusion of said meat is sufficiently small in cross-sectional area to have negligible cell rupture of said meat upon freezing said extrudate.

7. A meat product comprising a selected blend of lean meat in the range of 70% to 90% by weight and fat formed by comminuting uncooked deboned meat, extruding said comminuted meat to form elongated strands, freezing said strands, and comminuting the frozen strands to yield a quantity of frozen particles a majority of which have a maximum linear dimension of approximately .375 inches, said frozen particles being irregular in shape and being separable from one another in the frozen state to form a flowable quantity of meat product, and said particles being deformable and adherent to each other in the unfrozen state to form a substantially cohesive mass prior to cooking said mass.

8. A meat product comprising a quantity of frozen somewhat irregular shaped particles separable from one another and flowable to provide for subdividing said quantity of particles into portions of said meat product of preselected size, said meat product being formed by, providing cuts of uncooked meat free of bones, comminuting said cuts of meat into particle sizes not less than approximately .125 inches minimum linear dimension, said comminution including grinding said particles to produce a homogeneous mass, forcing said mass through means to extrude said mass into a plurality of elongated strands of indeterminate length, freezing said strands immediately upon formation of said strands, comminuting said strands while frozen into particles having a maximum linear dimension of approximately .125 to .750 inches, and placing preselected quantities of said particles in containers while maintaining said particles frozen so that said particles are separable from each other to provide for obtaining said portions of said meat product of preselected size.

9. The meat product set forth in Claim 8 wherein:

said meat product is composed of lean meat and fat in the range of approximately 70% minimum lean meat and 30% maximum fat by weight, respectively.

10. A process for manufacturing an uncooked meat product comprising a quantity of discrete pourable particles, which quantity may be subdivided into preselected portions prior to cooking; said process comprising the steps of:

providing cuts of raw meat substantially free from bones;

comminuting said cuts of meat to produce an extrudable mass of ground meat;

passing said mass through an extruder to produce elongated strands of meat;

quick freezing said strands; and

comminuting said strands into particles of frozen uncooked meat which are pourable and whereby preselected portions of meat may be subdivided from an aggregate amount of said particles while said particles are frozen.

11. The process set forth in Claim 10 wherein:

said strands are formed closely spaced and contiguous with each other prior to freezing said strands.

12. The process set forth in Claim 11 wherein:

said strands are frozen by passing said strands on conveyor means through a chamber and bathing said strands with a heat exchange fluid at a temperature in the range of 0°F to -40°F for a predetermined period of time.

13. The process set forth in Claim 12 wherein:

said period of time to freeze said strands is not greater than approximately two hours.

14. The process set forth in Claim 12 wherein:

said period of time to freeze said strands is not greater than approximately twenty minutes.

15. The process set forth in Claim 11 wherein:

the step of freezing said strands is carried out by conveying said strands through a chamber and flowing refrigerated air over said strands at a temperature of said air in the range of 0°F to -40°F.

16. The process set forth in Claim 10 wherein:

the step of comminuting said frozen strands includes breaking said frozen strands into multiple frozen pieces having a maximum linear dimension of approximately three inches.

17. The process set forth in Claim 16 wherein:

the step of comminuting said strands includes cutting said frozen pieces by passing said frozen pieces through a dicing apparatus to reduce the size of said frozen pieces to frozen particles, the majority of which have a maximum linear dimension in the range of approximately .125 inches to .750 inches in any given batch of said meat product.

18. The process set forth in Claim 10 wherein:

said meat product is composed of lean meat and fat in the range of approximately 70% minimum lean meat and 30% maximum fat by weight, respectively.

19. A process for manufacturing a meat product characterized by a quantity of frozen somewhat irregular shaped particles separable from one another and pourable to provide for subdividing said quantity of particles into portions of said meat product of preselected size, said process comprising the steps of:

providing cuts of uncooked meat free of bones;

comminuting said cuts of meat into particle sizes not less than approximately .125 inches minimum linear dimension said comminution including grinding said particles to produce a homogeneous mass;

forcing said mass through means to extrude said mass into a plurality of elongated strands of indeterminate length;

freezing said strands immediately upon formation of said strands;

comminuting said strands while frozen into frozen particles of meat having a maximum linear dimension of approximately .125 to .750 inches; and

placing preselected quantities of said particles in containers while maintaining said particles frozen so that said particles are separable from each other to provide for obtaining said portions of frozen meat product of preselected size.

20. The process set forth in Claim 19 wherein:

the step of comminuting said strands includes breaking said strands into pieces in the range of approximately 3.0 inches maximum linear dimension and then comminuting said pieces to provide said particles.

21. The process set forth in Claim 19 wherein:

fluid separated from comminution of said meat prior to extrusion is commingled with said meat to be reabsorbed during extrusion.

ABSTRACT OF THE DISCLOSURE

An uncooked ground beef meat product comprising frozen particles of ground, extruded, frozen and comminuted meat. The meat product is produced by a process including the steps of grinding, extruding the ground product into strands, quick freezing the strands, and breaking the strands into small particles in the frozen state in a size range on the order of .750 to .125 inches linear dimension. The meat product may be stored in a frozen state and portions subdivided from a bulk quantity without exposing the unused portion to thawing. Thaw times for the portions to be cooked are substantially reduced and fluid and weight loss in the meat product up to the cooking step is virtually nil.

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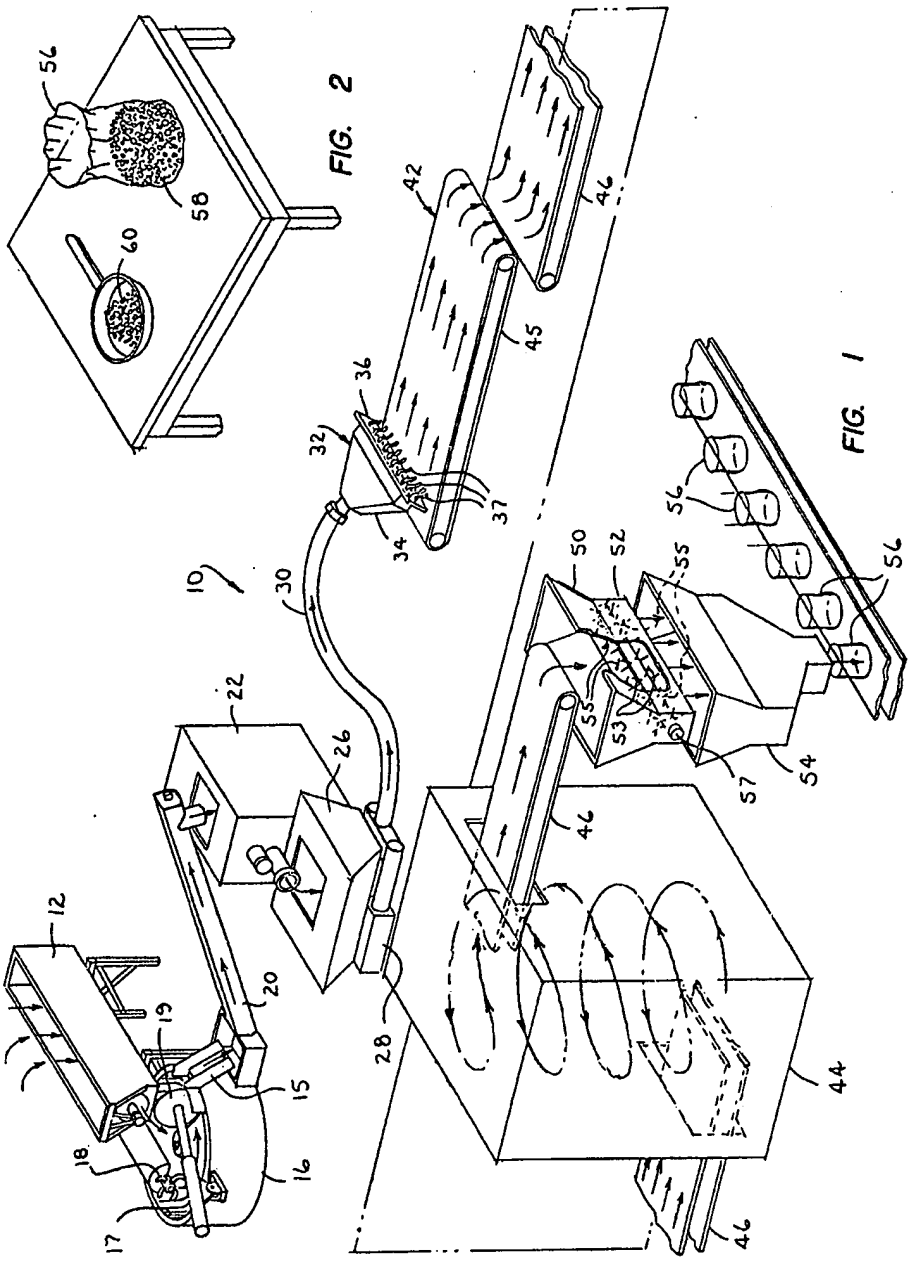

FIG. 1

FIG. 2

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